

'SUCH INGENIOUS BIRDS': FERDINAND MUELLER AND WILLIAM SWAINSON IN VICTORIA

by

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ABSTRACT

Maroske, Sara & Cohn, Helen M. 'Such ingenious birds': Ferdinand Mueller and William Swainson in Victoria. *Muelleria* 7(4): 529–553 (1992). — William Swainson and Ferdinand Mueller were both appointed botanists to the Victorian government by Lieutenant-Governor La Trobe, in 1852 and 1853 respectively. Swainson was a zoologist and illustrator who strongly supported the quinary system of zoological classification. He migrated to New Zealand in 1840. Ferdinand Mueller was a young, enthusiastic and relatively inexperienced German botanist who migrated to South Australia in 1847. The reports submitted by the two men to La Trobe during 1853 presented dramatically different views on the Victorian flora and its distribution and evolution. Swainson's *Botanical report*, his only botanical publication, has never been considered a worthwhile taxonomic document, while Mueller's signalled the beginning of a long and distinguished career spent studying the Australian flora.

INTRODUCTION

Ferdinand Mueller and William Swainson were appointed to botanical positions in the colony of Victoria within a few months. Swainson was accepted as a botanical draftsman on 11 September 1852 for one year, and Mueller as Government Botanist on 26 January 1853. In hindsight it is difficult to understand why Lieutenant-Governor La Trobe appointed Swainson. The short reports which he submitted in March and October 1853 seem at once remarkable for their ignorance, arrogance and inventiveness. Without the benefit of such hindsight, however, it would have been just as difficult to understand why La Trobe appointed Mueller. He was a young, unknown botanist, and a German in an English colony. Victoria's flora had been little explored prior to 1852, and the work of any contemporary botanist, however then or now regarded, carries with it all the significance of being among the 'first' in the field. This fact alone makes unravelling the story of Mueller and Swainson worthwhile. Why did La Trobe appoint them? What did they actually do? And why has Swainson been repeatedly dismissed in Australia's history of botany, whereas Mueller is revered as our foremost botanical pioneer?

'DISEASED OR PERVERTED IMAGINATIONS': SWAINSON'S LONDON CAREER

In 1840 William Swainson (Fig. 1) shook the dust of England from his feet and emigrated with family, library and entomological specimens to the other side of the world. He left behind a 25-year career as naturalist and writer and a somewhat equivocal reputation. As a skilled natural history draftsman and industrious writer he earned considerable respect. However, he displayed a regrettable propensity for engaging in heated public arguments, and in promoting his views was too single-minded for the taste of his colleagues. Swainson was deeply interested in natural history, particularly birds and insects, and shared his father's

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Fig. 1. William Swainson 1840 (Reproduced from *Taxidermy: with the biography of zoologists and notices of their works*. London, 1840.)

enthusiasm for collecting shells (McMillan 1980). He made the most of his opportunities while in Sicily with the army. After leaving military service in 1815, Swainson spent two years in Brasil, a country just opening up to scientific exploration (Farber 1985). The classification and publication of his Brazilian collections launched Swainson on his career and brought him within the orbit of the leading naturalists of his day.

In his wholehearted adoption of the new technique of lithography, and his skill in using it, Swainson deserves much of the credit for its favourable reception in Britain (Dance 1978). Lithography proved cheaper and quicker than engraving and, unlike copper plates, the stones could be reused (Knight 1977; Jackson 1975). From the artist's point of view, in drawing directly onto stone, the finished print was his own work; no longer was he hostage to the skill (or lack of it) of the engraver. With Swainson leading the way lithography quickly superseded engrav-

ing as the principal means of depicting natural history objects. The first such work published in Britain using lithography was Swainson's *Zoological illustrations* (1820–23), in which he brought his Brazilian collections before the public (Knight 1986b). Contemporary opinion held his artistry in high regard. His illustrations for *Birds of West Africa* (1837) were described as 'beautiful delineations' which 'owe nothing to the touch of imagination' (Anon. 1837a), while the reviewer of his *Flycatchers* (1838a) thought the printer's skill not equal to the lithographer's (Anon. 1838a).

Despite his reputation as an artist, Swainson never achieved a central position in scientific circles. This can be traced to his background and his position in the community of London naturalists; to his belligerent character; and to his unremitting reiteration of the merits of his own work and philosophical theories. Swainson was the son of a Liverpoolian customs collector, and therefore not of high social standing. As such he lacked the networks of contacts and patronage that still played a vital role in establishing a place in the circles to which Swainson aspired. This circumstance, and his lack of a university degree, counted against him in his first attempt to obtain a paid position as a naturalist in London. Swainson's activities as a collector and illustrator brought him to the fringes of London scientific circles. From there he tried to find himself a permanent and lucrative niche, and to secure a career as more than just a collector.

In 1822 he applied for the directorship of the Zoological Department of the British Museum. He had hopes of success, being now an experienced zoologist and having testimonials from men such as George Cuvier, J.E. Smith and William Hooker (Swainson 1840). However, Humphrey Davy, now President of the Royal Society, secured the position for J.G. Children of the Museum's Department of Antiquaries, a man with little zoological knowledge. The slightly clandestine manner of Children's appointment (not to mention the scandalously neglected state of the collections) caused a public outcry at least partly engineered by Swainson (Desmond 1985; Knight 1986b). There were, however, some telling arguments against Swainson's candidature; his orthography was suspect; his lack of a university education meant he was deficient in foreign languages, notably Greek and Latin. Finally and perhaps most importantly, he simply was not an establishment figure (Desmond 1985; Farber 1985; Gunther 1984). The whole experience left Swainson rather bitter.

With his path to institutional science blocked, Swainson turned to the precarious business of writing. His decision was given additional force when his father's death left him with a smaller inheritance than he expected, and failed investments left him in an even more parlous financial situation. With a growing family to support, Swainson took on a grinding workload. Until his departure from England Swainson's literary output was extraordinary. Between 1834 and 1840 Swainson wrote twelve books. Writing appeared to be virtually the only option open to him; he came to believe he was deliberately being excluded from an institutional career (Desmond 1985). Of his second unsuccessful application to the British Museum in 1837 he sourly remarked; 'I was not, however, so far honoured as to receive any notice to my application' (Swainson 1840).

This belief was reinforced by the circumstances of one of his most spectacular public squabbles. From 1830 Swainson worked with John Richardson on the publication of the bird volumes for Richardson's account of his Arctic expeditions, Swainson contributing much of the text and 50 lithographic plates (Richardson & Swainson 1831). Unfortunately many of the specimens he needed to consult had been placed with the Zoological Society. As a lapsed member he was denied access. Richardson tried to smuggle him into the Society's rooms; J.J. Audubon succeeded but they were discovered, and ignominiously removed themselves from the building (Desmond 1985). Swainson vented his spleen on the inflexible Secretary, N.A. Vigors. The two men engaged in a public slanging match, acrimony reverberating through the pages of the *Magazine of natural history* over a period of four years.

In brawling with Vigors, Swainson was in conflict with a man who in philosophical terms was his ally. Both were ardent disciples of the quinary system of zoological classification. This system was devised by William Sharpe MacLeay, an enthusiastic entomologist with impeccable connections to London scientific circles. After a sojourn in Paris, where he was close to the debate on natural zoological classification systems, MacLeay published his quinary scheme in *Horae entomologicae* (1819–21). This system was held to be natural because in its mathematical symmetry it reflected the intrinsic pattern and continuity of God's design for nature (Di Gregorio 1983).

The quinary system is notoriously difficult to understand but in simple terms it is based on circles of five, and on the principles of analogy and affinity. The animal kingdom was divided into five primary groups, each of these was further divided into five, and so on. In progressing from any given species, a series of beings was said to display natural affinities if it eventually led back to that original species, thereby creating a circle. For example, fish had affinities with amphibians via the tadpole, amphibians with reptiles through the adult frog, reptiles with birds by the flying pterodactyl, birds with mammals through the duck-billed platypus and mammals with fish via whales. Any given member of such a circular group was also held to be analogous with the animal which sat on the same place in another circular group. Thus, snakes and snails were on different circles but were analogous because both lacked legs and crawled on their bellies (Gould 1984).

Swainson took to himself the role of chief propagandist of the quinary system. He spent several years in perfecting his exposition and refining the number of circles to three. All of Swainson's books were exercises in arranging the animal kingdom into quinary format, his main essay being *A preliminary discourse on the study of natural history* (Swainson 1835b). The quinary system was a useful tool for Swainson in meeting his publication deadlines. Operating as it did on external characters, it allowed Swainson to write about whole groups of animals of which he had only the most superficial knowledge. He seems to have been unaware of (or ignored) much recent zoological research. As a result his fish were 'disastrous' (Günther 1900), the *Thylacine* was classified with the dogs, and his study of shells did not look at their inhabitants; conchology not malacology.

The zoological community was sharply divided about quinary theory. According to one's standpoint, either 'little less than wilful blindness is the barrier opposed to its admission as the only true basis of natural systematic arrangement', or the quinary system was only to be found 'in the diseased or perverted imaginations of those who uphold it' (Anon. 1837a). The debate soon spilled onto the pages of scientific journals. MacLeay's editors saw fit to apologise for his intemperate language in replying to a rival systematist (MacLeay 1830; Di Gregorio 1983). Swainson berated as unknowledgeable and malicious the critic of his *Preliminary discourse* (Swainson 1835a). Such was Swainson's reaction to any adverse comment that one reviewer nastily referred to 'Mr Swainson's no less convenient than ingenious belief, that limited zoological knowledge is the barrier to comprehension of the natural system with those who, like ourselves, have never come forward as converts to the principles embodied in his views on zoological classification' (Anon. 1838c).

In the face of all this controversy it is easy to overlook the fact that quinary theory was treated seriously as a zoological classification system during the 1820s and early 1830s. The rancour exhibited in skirmishes between its champions and detractors should not be taken to indicate that the quinary system was dismissed as ridiculous or unscientific. There was in fact a bewildering range of systems being proposed and vigorously debated (Di Gregorio 1983), and Swainson was by no means the only writer to base his work on this system. However, it was essentially a zoological system, barely disturbing the botanical community which was far more advanced towards general acceptance of one natural classification scheme. John Lindley was dismissive, remarking that he saw 'no necessity or propriety in combating a system which as far as Botany is concerned can scarcely be said to have an existence' (Knight 1986a).

Swainson's London career left him a disappointed and bitter man (Parkinson 1985; Knight 1986b). His living was precarious and he had not risen to the heights he would have liked. After his failure at the British Museum he held aloof from all institutional zoology, thereby cutting himself off from a forum for discussion that could have informed his theories (Knight 1986a). Swainson found it increasingly difficult to be conversant with all the subjects he was writing about. Mistakes were apparent in some of his later books, while theoretical commitment to the quinary system reduced the usefulness of others (Knight 1977; Farber 1985). With his fractious and ungenerous behaviour he alienated many of his colleagues. He was reproved for his assumption of superior knowledge and for his '*spirit of detraction*, or at least an unwillingness to do full justice to the merits of others' (Anon. 1837b, 1838b).

By 1840 Swainson had decided to leave England. He recognised that he would never be other than on the fringes of zoological circles. Unremitting authorship had worn him down and he was constantly frustrated by criticisms of his work (Swainson 1838b). The death of his wife in 1835 left him feeling England was no place to raise his children (Swainson 1840). His choice of destination was the infant settlement of New Zealand, attracted by the promises of the New Zealand Company. At over 50 years of age and with young children for whom to provide, this would seem a courageous move. In leaving England, Swainson was cutting himself off from the world he knew, and committing himself to a life for which the sedentary career of a writer had not prepared him; carving a farm out of virgin forest and making it viable. The Swainson family arrived in New Zealand in 1841 among the earliest settlers under a Wakefieldian emigration scheme of dubious legality (Pretty 1967; Dalziel 1981).

Swainson went to New Zealand hopeful of being able to pursue his natural history interests and even act as mentor to the other settlers (Swainson 1840). Sadly his hopes were dashed. Establishing the farm left little time spare for any other avocations. In common with many others, Swainson's farm did not flourish. Local Maoris, disputing the settlers' title to the land, subjected them to constant harassment which eventually flared into the Hutt War (Galloway 1978). True to form, Swainson became embroiled in arguments with the New Zealand Company, from whom he had bought his land (Natusch & Swainson 1987). In 1848 he suffered a severe blow when a disastrous fire destroyed house, farm buildings and implements, six-months provisions, and natural history collections (Parkinson 1985). He was reduced to reliance on his army half-pay.

What time Swainson could spare was devoted mainly to shell collecting. Although his projected New Zealand conchology never eventuated, he did publish a fern exsiccatum (Parkinson 1985; Natusch & Swainson 1987). In general, however, he found naturalists lacking and the flora disappointing; 'there is not a flower equal to our common foxglove, not so pretty as the ground ivy or dead nettle' (Galloway 1978). Even in New Zealand he maintained his scientific isolation. On being elected to the infant New Zealand Society Swainson took umbrage. His efforts to share his experience and knowledge having been treated with ridicule and disparagement, he refused to lend his name to the delusion 'that science is just as much honoured and cultivated in New Zealand as in the mother country' (Parkinson 1985).

Swainson must have seen the possibility of visiting Australia as a welcome relief from pressing domestic problems. The sale of land he owned in South Australia (the origin of which is unclear), now risen in value, would alleviate his financial worries. He also had acquaintances in New South Wales from whom he could expect a welcome. Foremost was William Sharpe MacLeay, now well-established at the centre of Sydney society and colonial natural history circles. As a fellow quinary, Swainson might well have expected to receive some notice from MacLeay but his correspondence is strangely silent about him. Swainson sailed for New South Wales aboard *Acheron* in May 1851 at the invitation of her captain, J.L. Stokes, with whom Swainson had sailed in 1849 collecting shells around the New Zealand coast. Once in New South Wales, Swainson spent most of his time in

the Illawarra district awaiting the papers related to the sale of his South Australian land (Natusch & Swainson 1987). Here he happily occupied himself investigating the local eucalypts (Swainson to Deas Thomson, 30 July 1852).

Swainson's career was drawing to an end when he arrived in Australia, while Mueller's was only just beginning. It was, however, the northern hemisphere experiences of both men that determined what qualifications they had to offer employers in the south. Both men received their scientific training without the advantages of wealth and connections. Nevertheless, while Swainson's pursuit of his science was colourful and controversial, Mueller's was a lesson in orthodoxy.

'TO DEVOTE MYSELF TO THE NATURAL SCIENCES': MUELLER'S BACKGROUND

When his father died in 1835 the ten-year-old Mueller's prospects must have looked bleak. His mother moved the family from Rostock, where her husband had worked as a customs controller, to live among relatives in Tönning. In 1840 tuberculosis struck the family a second time, leaving Mueller an orphan. Before dying, however, Louise Mueller managed to apprentice her son to a pharmacist in Husum, A.G. Becker. It was possibly through the influence of this man that Mueller became interested in botany, and determined to devote himself to its study. Later in life Mueller recalled to R.J.D. von Fischer-Benzon that the Scandinavian geologist, J.G. Forchhammer, had also received his first education in natural history in Becker's house. In 1842 Becker died and the pharmacy went to his nephew E.G. Becker. 'I want to acknowledge,' Mueller told Fischer-Benzon in 1887, 'that [this nephew] cared for the orphaned boy with almost fatherly affection' (Mueller to Fischer-Benzon, 16 Dec. 1887).

By 1845 Mueller's circumstances were secure enough for him to enrol at the University of Kiel; 'partly to pass the pharmaceutical state examination', he recalled to Fischer-Benzon, 'and particularly to devote myself to the natural sciences' (Mueller to Fischer-Benzon, 16 Dec. 1887). He submitted a thesis on a local plant, *Capsella bursa-pastoris*, and graduated with a doctorate in philosophy in 1847. By this time he had also prepared manuscripts on the flora of Husum, and of Schleswig-Holstein (Mueller 1847). He was 21 years old.

Meanwhile Mueller's oldest sister, Iwanne, had succumbed to tuberculosis. Believing that he also would not survive the next winter he decided to emigrate with his two remaining sisters, Bertha and Clara. The destination they chose was South Australia, as Mueller later recalled; 'where the stream of German emigrants mainly flowed'. It was also little-known botanically, and thus offered a rich field for original research. '[M]y botanical excursions into the open fields', Mueller recalled to Fischer-Benzon, 'had already then aroused the fervent wish, to explore independently in other parts of the world.' Mueller had also read F.H.A. von Humboldt's *Voyage aux régions équinoxiales de nouveau continent*, and it further stimulated his desire to travel (Mueller to Fischer-Benzon, 16 Dec. 1887).

Mueller's ship-board possessions probably included Robert Brown's *Prodromus florae novae hollandiae*, volume one of J.G.C. Lehmann's *Plantae preissianae*, and the first volumes of A.P. de Candolle's *Prodromus systematis naturalis regni vegetabilis*. At that time these were the most significant works on or including Australian plants, which were arranged in a natural system. Botany was revolutionised in the eighteenth century when Linnaeus established binomial nomenclature, and a system of classification based on stamens and pistils. Nevertheless, Linnaeus himself called this system artificial, believing that it was not for any man, however talented, to impose his ideas on the limitation and affinity of species. The plant kingdom was conceived of and created by God on the third day. A 'natural' system of classification, therefore, would be one based on His plan, painstakingly revealed by the study of multiple characters, and the grouping of species which were related by their simultaneous creation, and divine logic (Morton 1981).

The idea of a natural system was soon accepted in European botany. In 1789 A.L. de Jussieu published his *Genera plantarum* which not only used Linnaean nomenclature but also extended the work of this famous botanist on affinities in species and genera to higher levels in the taxonomic hierarchy. It was the work of the de Candolles, however, that was to become the basis of the *International code of botanical nomenclature* in the late nineteenth century. A.P. de Candolle saw the first of his eight volumes of his *Prodromus* published in 1818, and his son, Alphonse, brought the number up to twenty by 1873. The work was intended to describe and arrange all known plants, and succeeded in covering 80,000 species, but did not extend beyond the dicotyledons.

Mueller's set of de Candolle's *Prodromus* survives in the National Herbarium of Victoria Library. Volume one bears the inscription — 'Ferd. Mueller / botany student / Kiel 1846'. 'I hasten to assure you', he wrote in reply to a letter from Alphonse de Candolle in 1858, 'that the manifestations of kindness and satisfaction from so great a man as the author of the prodromus have been a source of great pleasure to myself'. The same letter also revealed that Mueller had been so bold as to offer a contribution to the *Prodromus*, supplementing the work of the German botanist C.F. Meisner on the Proteaceae family (Mueller to A.L.P.P. de Candolle, 9 Jan. 1858). Meisner's work appeared in volume 14 of the *Prodromus*, which was published in 1856. An 'Addenda et corrigenda' for the volume was brought out sometime after November 1857, and it does contain additions attributed to Mueller, including a description of *Grevillea alphonsiana* (Mueller 1857).

British botanists were slow to accept the natural system, and critical of early works using it. Robert Brown was so disappointed with the reception of his *Prodromus* in 1810 that he withdrew it from sale, and decided against bringing out a second volume (Stearn 1962). Furthermore, *Plantae preissianae* was disregarded because of the inferior scholarship of one contributor, E.T. Steudel (Diels 1906; Stearn 1939).

Mueller did not share these prejudices. There are three copies of Brown's *Prodromus* at the National Herbarium of Victoria Library out of an original print run of only 250. One of these copies was a gift to Mueller from the German botanist, O.W. Sonder. In an undated inscription Sonder wrote 'a most rare book!'. Inside are handwritten annotations by another German botanist and former owner of the book, Curt Sprengel. There is also a copy of *Plantae preissianae* at the National Herbarium Library which Mueller annotated copiously from the time he arrived in Adelaide. This work, once again, may have been a gift from Sonder, because there is an inscription at the front of the book in his handwriting 'I demand instruction, truth and knowledge'.

Mueller wasted no time in studying Australia's flora, collecting his first specimens over the side of the *Hermann von Beckerath* before it came into harbour at Adelaide. Two of these, *Sargassum distichum* and *Sargassum spinuligerum*, survive in the National Herbarium of Victoria, with the locality 'floating fragment from the ocean gulf of St Vincent', and the date 15 December 1847 (Womersley & Sinkora 1987). Mueller's paid work in Adelaide was as a pharmacist in Rundle Street, but he spent his spare time botanising. At first he explored the immediate vicinity of his new home, and then made forays further afield to Guichen Bay, the Mt Lofty Range, the Murray scrub and the Flinders Ranges. Two papers resulted from this early research on South Australian plants; 'Notes on South Australian botany' in the *South Australian register* and 'Der Murrayscrub, botanisch skizzirt' in *Hamburger Garten — und Blumenzeitung* (Mueller 1850, 1852). In 1852 he decided to move to Victoria to open a pharmacy on the goldfields. For Mueller the lure of new botanical territory must have been just as strong as the desire for financial gain.

Despite the early death of his parents, Mueller had been able to qualify as a pharmacist with a university education. A.G. Becker fostered Mueller's interest in botany and Mueller's extended family did nothing to oppose it. 'I would almost

like to shout to you: follow your own heart and inclination', wrote Mueller's uncle J.F. Mertens in January 1847. 'You alone! will know best what is most useful to you now' (Mertens to Mueller, 21 Jan. 1847). Mueller claimed to Fischer-Benzon that he received 'two for a young man splendid offers' in Schleswig-Holstein, but that he declined them in favour of Australia. '[L]ife with its hopes lay still largely before me', he exclaimed, 'when I began to explore with youthful enthusiasm the wonders of the plant world as far as they presented themselves to me' (Mueller to Fischer-Benzon, 16 Dec. 1887).

'SUCH INGENIOUS BIRDS': LA TROBE AND THE APPOINTMENTS OF SWAINSON AND MUELLER

Mueller's arrival in Victoria was opportune. This colony was singularly fortunate in having as Lieutenant-Governor, Charles La Trobe (Fig. 2), whom Mueller referred to as 'our scientific Governor' (Mueller to William Hooker, 3 Feb. 1853). From the time of separation from New South Wales in 1851, government was carried out by the governor with his executive council and a legislative council, some members being nominated by the governor and others elected



Fig. 2. Charles La Trobe c.1854 (Reproduced from *Lithographic portraits of early pioneers*, by permission of the La Trobe Collection, State Library of Victoria.)

according to a tightly restricted property franchise. La Trobe was able to exercise considerable control over the colony's government both directly through the executive council and indirectly through his choice of nominees for the legislative council. Victoria's expanding wealth as a consequence of the gold rush combined with La Trobe's own interests, and he was in the happy position of being able directly to influence the appointment of the first scientific officers to Victoria's civil service.

La Trobe's broad interest in natural history did not find initially much nourishment in Victoria, where there were as yet few scientists or amateur naturalists. News of gold discoveries sparked an early attempt to establish a geological society but this quickly foundered (Paszkowski 1967). Frederick Adamson and J.G. Robertson are among the small number of amateur botanical collectors of whom anything is known. Robertson came to Victoria in 1840 from Tasmania to take up farming in the Western District near Casterton. Adamson, on the other hand, did his collecting around Melbourne. Both men returned to England in the early 1850s, taking their collections with them to lodge at Kew (Maiden 1908; Rupp 1941). A more colourful character was Daniel Bunce, who had accompanied Leichhardt as botanical collector in 1846 and unsuccessfully applied for the curatorship of the Melbourne Botanic Gardens in 1849. By the early 1850s he was a columnist for the *Argus* while residing on the goldfields (Holden 1966; Fox 1989). With little time spare from his official duties, and starved as he was for scientific contacts in Australia, La Trobe was always pleased to find a fellow enthusiast. He wrote to the Tasmanian amateur botanist Ronald Gunn in October 1852; 'You judge rightly that I have not much time for natural history — however my interest in it is unabated & I am always glad to get hold of any one who knows anything about it & is observant. Such "ingenious Birds" are very rare here however' (La Trobe to Gunn, 8 Oct. 1852). In 1852, two of these rare birds came his way.

The first was William Swainson. From the relative peace and security of Illawarra, Swainson offered his services to the Victorian government as botanical draftsman in July, outlining an ambitious project to investigate the native flora (Swainson to Deas Thomson, 30 July 1852). Hedging his bets, Swainson made the same offer to the New South Wales government. For the sum of £450 and the provision of two horses and a manservant, he proposed to spend twelve months examining the timber trees of the colony, collecting specimens and making drawings. Initially it seems odd that a zoologist should offer his services as a botanist. However, his offer noted the potential use of the local trees as a source of timber which he may have seen as a possible investment for himself. As well, he was already engaged in a study of the trees around Illawarra and saw an opportunity to be paid for doing so. In particular, his attention was to be directed to the eucalypts, the classification of which was in a mess (he believed) having so far defeated the attempts of botanists to bring it into order. Here was the Swainson of old, dismissing out of hand the work of scientists far better acquainted with the subject than himself.

On receiving Swainson's letter, La Trobe wasted no time bringing it before the Executive Council, urging 'that the proposition might be highly useful to science, and to the development of the resources of the Colony, and that the necessary expense might well be [borne] from the abundant Territorial revenue' (Executive Council minutes, 23 Aug. 1852). The Council concurred with La Trobe, notification being sent to Swainson that the Victorian government was willing to engage him at the salary of £350 plus allowances. New South Wales having declined his services, Swainson accepted the Victorian offer, thereby becoming the first person employed in a botanical capacity by the Victorian government. He designated 11 September 1852 as his starting date.

It is difficult to know why La Trobe was so anxious to engage Swainson. He was not a botanist and had published no botanical papers. (It has been questioned whether the paper on Tasmanian trees published by the Royal Society of Tas-

mania in 1851 was written by our William Swainson or his namesake, who became New Zealand's first Attorney General (Jackson 1975).) Swainson claimed acquaintances with La Trobe even before he left England (Galloway 1978; Swainson to Deas Thomson, 30 July 1852), but La Trobe gives no indication of acknowledging such an acquaintance. Most likely, he was only too pleased to take up an offer so much in keeping with his personal interests, and one which allowed him easily to institute some scientific investigation under official sanction at a time when administering a colony struck with gold fever took all his time. The burgeoning colonial revenues removed any problem of remuneration.

If he were looking for a botanist to survey systematically the local flora La Trobe might well have looked to Frederick Adamson, J.G. Robertson or John Dallachy, Superintendent of the Botanic Gardens. Bunce was another possibility having published in 1851 a small booklet which purported to list the known flora of Victoria (Bunce 1851). Gunn assessed the work as a fraud; not only was it cribbed from an 1835 list of Tasmanian plants published in Hobart, but it omitted many of the plants known from around Melbourne and Geelong and included others known only in Tasmania (Pescott 1950). Since La Trobe was in frequent correspondence with Gunn it is likely he was aware of Gunn's opinion, and so would not have looked in Bunce's direction.

There is no indication, however, that La Trobe had considered a systematic botanical survey until the idea was planted by Swainson's appointment, and by the urgent necessity of appointing a mineral surveyor. The discovery of gold had rather overwhelmed La Trobe and his government. Mass immigration and the dramatic spread of settlement brought enormous problems for the civil authorities. Somewhat late in the day, La Trobe asked the Colonial Office to find him a qualified geologist, thinking that a properly conducted mineral survey of Victoria might help to control the gold fever. Alfred Selwyn was already on his way to Victoria in August 1852 when Swainson's proposal was being considered. It was in these circumstances that La Trobe's second rare bird, Ferdinand Mueller, became known to him.

It has long been believed that William Hooker was responsible for Mueller's appointment as Government Botanist but this is untenable (Cohn 1989). Responsibility rests squarely with La Trobe. His correspondence with Gunn (so far largely unutilised) is illuminating. 'There is an honest looking German here', La Trobe wrote to Gunn in October 1852, 'who as far as I can judge seems to be more of a botanist than any man I have hitherto met with in the Colony' (La Trobe to Gunn, 8 Oct. 1852). Since the same letter informed Gunn of Swainson's engagement, Mueller must have greatly impressed La Trobe. His own European background enabled him to appreciate the talents of the Europeans he met. Mueller furnished La Trobe with a description of Meisner's genus *Latrobea*, noting that two of its species, *L. brunonis* and *L. genistoides* were formerly attached to *Pultenaea*. 'He tells me', La Trobe continued, 'that an exceedingly pretty dwarf acacia flowering most abundantly in its native soil at Jolimont has been distinguished by my name also'. It seems, therefore, that Mueller made what can only be described as a calculated approach to La Trobe. 'I shall give him every encouragement', concluded La Trobe.

The official letter notifying Mueller of his appointment as Government Botanist does not reveal much about the position. It simply states that he was to receive £400 a year from 26 January 1853 (Lonsdale to Mueller, 26 Jan. 1853). If La Trobe gave any written instructions to him they have either not survived or not yet been discovered. However, as no other scientific officer's instructions are known to exist is it possible that Mueller was not given any. In his letters to La Trobe via the Colonial Secretaries, William Lonsdale and John Foster, Mueller constantly refers to 'my flora of this colony' and 'my collections' on which he was working 'according to His Excellency's commands'. From the first, Mueller's own plans were much more ambitious. In a letter dated 7 July 1853 to Ronald Gunn he suggested a plant exchange with a view to obtaining 'those which I would be

delighted to receive for the increase of the material for my "*Flora Australiae universa*" (Mueller to Gunn, 7 July 1853). Since 1839 he had also been collecting dried specimens for a herbarium representative of the world's flora. Later in life he recalled to the New Zealand botanist T.F. Cheeseman; 'I always sought a special pride by enriching it with original specimens of author's' (Mueller to Cheeseman, 8 Aug. 1895).

'Government Botanist' was Mueller's official title but it was also one occasionally used by government clerks to describe Swainson. Moreover, in the 1852 Legislative Council papers are printed copies of letters between Swainson and the Victorian authorities under the heading 'Copy of correspondence respecting the appointment of William Swainson, Esq. as Government Botanist' (Anon. 1852). Who then was Victoria's first Government Botanist — Mueller or Swainson? In his letter of invitation to La Trobe in August 1852 Swainson referred to himself as a 'botanical draftsman', and does not thereafter use the term 'Government Botanist' relative to himself. Later he described himself as 'botanical artist and demonstrator' (Swainson to Lonsdale, 16 Apr. 1853). La Trobe was also quite clear as to titles. In March 1853 when confronted with yet another file relating to Swainson marked 'Government Botanist', La Trobe crossed out the offending words and wrote "why is it persisted in calling him [this?]" (La Trobe, March 1853 annotation on VPRS 1189, unit 203, B53/2548). No written answer by the clerk was vouchsafed. While Swainson was Victoria's first government-employed botanist, Mueller was clearly the colony's first Government Botanist.

'A GRUMBLER OF THE FIRST WATER': SWAINSON'S AUSTRALIAN FIELD WORK

By the time Swainson reached Sydney he was 62 years old and in poor health. The bitterness engendered by the downturn of his career in England had been followed by great hardship and privation in New Zealand. He must have viewed the prospect of some time at leisure pursuing natural history with some relief. Having received notification from Victoria of that government's willingness to employ him, he decided to finish what he already had in hand before starting work. It was only from the middle of September 1852 that he considered himself on the payroll. His intention was to travel overland to Victoria collecting along the way (Swainson to La Trobe, 7 March 1853). From Illawarra, he went to Parramatta and then turned south, reaching Goulburn at the end of October. Here he was struck down during a local epidemic and was laid up for six weeks. Even so he managed to discover 42 new species of gum trees. On medical advice, Swainson returned to Sydney but was not able to secure a steamer berth for Melbourne until mid-January. Four months of his 12-months engagement had expired before he arrived in Victoria.

Once in Victoria Swainson settled himself in Dandenong (Fig 3). Immediately he found cause for complaint. The residence allocated to him was an 'unfinished slab hut' which urgently needed weather-proofing. He had no drying paper or other equipment necessary to do the work. 'I have collected on foot, as far as my present ill health has permitted: but having nearly lost my life by being benighted in the Dandenong forests, I must be excused from making such excursions for the future' (Swainson to La Trobe, 7 March 1853). He soon removed himself from his unsatisfactory cottage and found lodgings some way out of Dandenong. From here he seems hardly to have stirred; 'so little of the country has been visited by me in consequence of being left without funds to defray the enormous expenses of travelling, and from being in no position to make further advances, from my own resources, on account of the local government' (Swainson to Lonsdale, 16 April 1853). Even the single assistant provided from the Botanic Gardens staff was insufficient.

Many of his complaints centred around payment of his salary and allowances and the provisions he expected to receive. There was one particularly acrimonious



Fig. 3. Ragged bark Eucalyptus, Dandenong swamps. Drawing by William Swainson. (Reproduced by permission of the Alexander Turnbull Library, Wellington, New Zealand.)

dispute about the supply of potatoes which Swainson claimed he did not receive (Childers to Foster, 13 Aug. 1853). Swainson, who prided himself on having been in the commissariat in the army, was taken to task for his sloppy accounts. 'You must not take offence at my remarking that, from first to last, if you have met with difficulty in your transaction of business with this government it is solely to be attributed to want of attention to the most ordinary forms and rules, as will be shown whenever you may come to Melbourne and proceed to adjust your accounts' (La Trobe to Swainson, 6 July 1853). Since it is doubtful that Swainson was given precise instructions on how he was to proceed, La Trobe's exasperation got the better of him in this instance.

Much of Swainson's venom was reserved for Mueller. While he was allocated an inadequate building, 'the Government caused a new and very comfortable room to be erected, at one of the buildings at the Botanic Gardens for the *additional* accommodation of the relations of the Colonial botanist' (Swainson to Legislative Council, 17 March 1854). He pointed to the higher salary enjoyed by

Mueller. 'It appears to me repugnant to justice or equity, that a young Gentleman, who has just entered the walks of Science, (more as a Collector, than a Demonstrator of Botany) should have his services more heavily remunerated than one, who, having laboured in Science for *half a century* is now about to terminate his career' (Swainson to Foster, 6 Oct. 1853).

La Trobe became very tired of the stream of complaints coming from Dandenong. He wrote to Gunn; 'all I can say is that with all his undeniable talent I have found him a very hard bargain — as helpless as a child, & a grumbler of the first water' (La Trobe to Gunn, 30 June 1853). He even doubted whether, given Swainson's evident poor health, anything would be accomplished by his visit to Victoria (La Trobe, 14 March 1853). During the eight months Swainson spent in Victoria he ventured no further than the immediate surroundings of Dandenong.

'CARELESS OF EASE': MUELLER'S EARLY FIELD WORK IN VICTORIA

A very different picture is presented by Mueller. In the first year of his appointment he embarked on two substantial field trips. The first took him on a circuit through the eastern half of the colony, starting in the Alps, heading south through Gippsland and back to Melbourne via Wilson's Promontory. In the second he circled the western half of the colony, from the Grampians north to the Murray River then back to Melbourne through the Alps. 'This exploring line', he explained to La Trobe, '[will] enable me to accumulate to a certain degree the materials for the Flora of this province' (Mueller to Foster, 22 Oct. 1853).

Mueller expected that much of Victoria's flora would be the same as that already known to exist in adjacent colonies, with the northern regions being similar to New South Wales, the west to South Australia, and the south to Tasmania. Furthermore, he knew from the books that he had brought with him to Australia that many of the species which were unique to Victoria had already been discovered by this colony's previous botanical visitors. Robert Brown had explored some of the coastal areas in Port Phillip Bay in 1802 and 1803–4. Adamson, Robertson, Bunce and La Trobe had all collected around the settlements, and in 1835–6 Thomas Mitchell had traversed the state from north to south, including the Grampians. 'I feel perfectly convinced,' Mueller therefore concluded, 'that the more distant localities in the East and North of Gipps land must be considered as the richest and most deserving country for a full phytological exploration' (Mueller to Lonsdale, 10 May 1853).

Gillbank (1992) has provided a detailed discussion of Mueller's 1853–4 excursions. From this it is clear that he did not penetrate as far into the Alps as he had hoped to do, because of unseasonal rain. Moreover, he at times mistook his location because local magnetism distorted his compass readings. Nevertheless, these trips did demonstrate in Mueller a capacity for physical endurance, and a pioneering spirit. 'My clever little botanist has returned', La Trobe told Gunn in June 1853, 'having done quite as much as I expected and more than any but a German, drunk with the love of his Science, — and careless of ease — and regardless of difficulty in whatever form it might present itself could have effected in the time and under the circumstances' (La Trobe to Gunn, 30 June 1853).

The experiences which Mueller and Swainson had in their field work determined to what extent they were able to fulfil their original aims. In the light of Swainson's complaints and Mueller's successes it is perhaps surprising to find that, while Mueller produced two substantial reports, Swainson still felt able to make many bold generalisations.

'WITH THESE FACTS BEFORE US': SWAINSON'S REPORTS

The impression given by Swainson is that, before his work, nothing of any account had been written on the eucalypts. 'It is well known', he told La Trobe in 1852, 'that . . . the "Gum trees" remain a *chaos* even after the labour bestowed upon their elucidation by such eminent men as Robert Brown, the two Cunning-

hams, and the most distinguished botanists of Europe'. Only one scientist was allowed to have said anything relevant on the subject, fellow quinarian, W.S. MacLeay. And even this man, who was the 'first authority perhaps on such questions in existence' could do no more than lament the lack of information on the subject (Swainson to Deas Thomson, 30 July 1852).

Swainson asserted that not more than 40 species of eucalypts had been published as inhabiting the whole of Australia. *Index kewensis*, however, lists 164 species of eucalypts as having been discovered up to and including 1852, 108 of which were still regarded as valid (Jackson 1885). If Swainson had consulted only de Candolle's *Prodromus* (vol. 3, 1828) he would have found 52 species listed. Lehmann's *Plantae preissianae* contained 15 species, most of which were not in de Candolle. The only volume of Brown's *Prodromus*, however, did not treat the eucalypts.

In his progress report of March 1853 Swainson revealed what he believed to be the principle of eucalypt variation. '[E]very change in the geological formation of Australia over the whole of the continent,' he asserted, 'is accompanied by a marked difference not merely in the *species*, but [also] in the *Genera* of the Eucalyptus family' (Swainson to La Trobe, 7 March 1853). Illawarra yielded him 70 species of eucalypts; the sandstone formations at Parramatta 40 species; Goulburn, with its granitic formations, 42 species; the elevated sandstone of the Blue Mountains 'many' species, and Dandenong in Victoria 55 species so far. 'Each is peculiar in its own geological formations', Swainson declared, 'and not a single species of Eucalyptus has been found by me in any *two* of these localities'.

Swainson's final eucalypt total for Victoria was a massive 1520 species, which must have taxed even his powers of invention when it came to naming them. 'I am therefore disposed to think', Swainson concluded, 'that even if two thirds may hereafter prove varieties only, there will yet remain more than 500 *species botanically* distinct, only two or three of which I have found in New South Wales' (Swainson to La Trobe, 2 Oct. 1853).

Mueller was not impressed by these figures. He said of his own tally of the Victorian flora that it could easily have been doubled, 'but through a long continued examination of the Australian plants in a living state I had the advantage of learning how great [is] the uncertainty of many characteristics, which are deemed even by our greatest authorities in science sufficient for distinction' (Mueller 1853). It is true that Swainson's field experience in Victoria was considerably less than that of Mueller, but combined with what he had done in New South Wales it was certainly enough to observe eucalypt variation.

There is little indication in Swainson's Australian writings of his ideas on systematic botany. He used an hierarchical organisation when referring to the eucalypts, but treated them as a family rather than a genus (Swainson to La Trobe, 2 Oct. 1853). In letters to Gunn he suggested that capsules furnished the main characters for the limitation of his eucalypt species. Moreover, he asserted that these capsules had to be examined in a living state, because they entirely altered their appearance when dry. He did not believe that any specific characters were provided by leaves (Swainson to Gunn, 13 & 25 Feb. 1854). In a letter to William Hooker of July 1854 Mueller said that he had tried to tell Swainson that the laws of distinction in entomology could not be used on plants, 'which are a complex of individuals fixed to a soil of not always equal composition and situation and climate' (Mueller to Hooker, 14 July 1854). None of Swainson's letters or his reports, however, mention affinities, analogies or any other distinctive terms of quinary theory. Swainson may have treated as species what Mueller treated as varieties but such disagreements were possible within the de Candollean natural system.

The minor part of Swainson's final report was concerned with the practical consequences of his work. 'I have now materials, also for asserting', he informed La Trobe, 'that in very many instances [eucalypts] are [disposed] in *veins above* the earth, as regularly and as definitely, as veins of earths or metals are [disposed] *beneath* the surface'. In the gold-obsessed society of Victoria the significance of

this statement was not lost on Swainson. 'With these facts before us,' he asserted, 'we are justified in concluding the whole of Australia will exhibit the same, and that consequently a time will come when the Auriferous districts hitherto undiscovered, will be at once made known by the particular genera of *Eucalypti* that I doubt not, will be found upon their surface' (Swainson to La Trobe, 2 Oct. 1853).

In making these claims Swainson was suggesting an immediately practical application for the study of botany to the colony. George Neumayer used much the same argument about the merits of his proposed magnetic survey when trying to interest the government in supporting his work. The discovery of gold was undoubtedly the major preoccupation of the colonists at that time. The surveys undertaken by Mueller's geological counterpart, Alfred Selwyn, were directed largely towards mapping the distribution of gold in Victoria. Even Mueller made some notes on the locations of quartz veins in his early reports (Mueller to Lonsdale, 9 March 1853). Regardless of how the idea of 'golden eucalypts' may seem today, any suggestions of easy ways to locate gold were likely to be given a respectful hearing in Victoria in the 1850s.

Despite complaining about not having the resources to complete his work on eucalypts, Swainson found himself able to comment on the casuarinas as well. 'During the last year,' he informed La Trobe, 'I have made various attempts and experiments to discover the[ir] principles of variation' (Swainson to La Trobe, 2 Oct. 1853). Swainson called them the 'true pines' of Australia and, along with the genus *Exocarpus*, 'the most extraordinary groups of Trees yet discovered'. 'It was only in June last, however,' he told La Trobe, 'that this discovery was effected, and the conviction then arrived at, that all the descriptions now existing, were perfectly and essentially defective, and therefore quite useless'.

Mueller complained of this 'offensive statement' to William Hooker in a letter of July 1854; 'Not even my laying before him Walpers extracts of Miquel's splendid monographia of the Casuarina, of the existence of which he was unaware, could induce him to [change his mind]' (Mueller to Hooker, 14 July 1854; Walpers 1848-1849; Miquel 1848). Swainson's final report contained the names of 'more than *Two hundred* species, all still growing within a very short distance of this place'. *Index kewensis* lists 31 species published by Miquel of which it regarded 10 as still valid (Jackson 1885). The total number of casuarinas for Australia which it listed as having been published by 1852 was 65, only 23 of which it still regarded as valid.

Swainson claimed that the 'Australian pines' belonged to a primeval flora that was slowly but surely being replaced by 'a more recent order of vegetables'. He wrote, 'In this respect they offer a wonderful analogy to what we have ourselves witnessed in regard to the aboriginal tribes of Australia, now giving place to those of the Caucasian Race'. Swainson determined more than 200 species of these 'aborigines of the vegetable world', all growing within a short distance of his base in Dandenong. He could not give a precise figure, because some specimens were too decayed. 'They have, in fact, died from excessive age', declared Swainson, 'and have left no successors' (Swainson to La Trobe, 2 Oct. 1853).

Darwin's *On the origin of the species by means of natural selection* was still five years from publication when Swainson made these remarks. There were earlier scientists such as Lamarck and Chambers who also propounded evolutionary theories (Oldroyd 1980) but it is not known if Swainson was familiar with their work. Moreover, the brevity of Swainson's remarks about casuarinas makes it difficult to determine what he was suggesting at all. His analogy between aborigines and caucasians suggests a belief in the 'succession' of species (where one species is replaced or displaced by another) rather than their evolution. Nevertheless, his reference to 'recent' orders of vegetables implies that he did not believe that God created all species on the third day.

In making even cursory speculations about changes in species, however, Swainson allied himself with a theoretical movement which was gaining in

respectability. Mueller on the other hand was opposed to what he called 'transmutation theory' and remained so all his life. In 1864 he used the publication of *The vegetation of the Chatham Islands* to declare his belief in the constancy of species; 'be it understood, nature only created species, occasionally but not permanently obliterated in their characters by hybridism' (Mueller 1864).

'FORTUNATE ENOUGH TO OBSERVE': MUELLER'S BOTANICAL FINDINGS

In stark contrast to Swainson, Mueller meticulously contextualised his work in that of other botanists. The books which he brought to Australia enabled him to start his first expedition in 1853 with already about 750 species in his census of Victorian plants. By the end of the trip this number had swollen to about 1100, 'and comprise, I think nearly half the here indigenous vegetation' (Mueller 1853). In his second expedition he added another 726 plants to the census making a total of about 1700 species, 680 genera and 134 natural orders (Mueller 1854). Many of these additions were plants which had already been described in other colonies. He inserted his own discoveries in the census without any special distinction.

Swainson was happy to make good this deficiency. With some satisfaction he told La Trobe that he had found 55 new species of eucalypts within a few miles of his cottage at Dandenong; 'a greater number, in fact, than Dr Mueller (as he told me) had succeeded in discovering in *all* the parts of southern Australia, and Victoria, that he has yet visited' (Swainson to Campbell, 28 June 1853). Moreover, Swainson was even so bold as to examine the plants in Mueller's own backyard, the government domain and botanic garden, 'because the Colonial Botanist has not the knowledge . . . of undertaking this desirable object'. This work yielded him another 39 new species (Swainson to Campbell, 28 June 1853; Swainson to La Trobe, 2 Oct. 1853).

Like Swainson, Mueller believed plant distribution was influenced by geography. 'I was fortunate enough to observe' Mueller wrote during his second expedition that many of the plants which Allan Cunningham collected in Illawarra were also to be found towards the mouth of the Snowy River and along the Brodribb and Cabbage Tree Rivers. Mueller explained this coincidence by reference to the proximity of the coast and sheltered terrain (Mueller to Foster, 10 March 1854). But was this observation also a subtle criticism of Swainson's work? Swainson claimed to have discovered 70 species of eucalypts in Illawarra. But, as Mueller noted, Cunningham had already named most of this region's plants long ago. Swainson also did not find any of Illawarra's eucalypts in Victoria. In fact, unlike Mueller, Swainson never seemed to find any two areas that were geographically and botanically alike.

Mueller concluded that at 7:2 the proportion of dicotyledons to monocotyledons in Victoria was similar to all other colonies except Western Australia and subtropical South Australia (Mueller 1853). After his second expedition he refined this generalisation somewhat by noting that the north-western desert areas of Victoria yielded a proportion of 9:2 which was similar to Western Australia and subtropical South Australia (Mueller 1854). Mueller also concluded that cryptogams were twice as numerous in Victoria as in South and Western Australia because of the first colony's greater humidity. Finally, at the level of family representation he initially found that Leguminosae dominated in Victoria, as in Western Australia, but later discovered Compositae to have the greatest number of species in Victoria, as in South Australia and most countries of the world (Mueller 1853).

More than twice the number of species that Mueller found in Victoria are now known to exist (including many naturalised plants). Moreover, there have been changes to the limitation of species, and to their arrangement in genera and families. Nevertheless at about 6:2 the proportion of dicotyledons to monocotyledons is still comparable with Mueller's figure. Compositae is also still held to be rep-

resented by the largest number of species in the state, followed by Leguminosae (Ross 1976). Finally, Mueller's observations on plant localities remain uniquely valuable if only for their information on how the indigenous flora was distributed in the state before the large scale clearing and agricultural use of the land that has taken place in the last 150 years.

Mueller and Swainson's reports were also both concerned with the practical uses of Victoria's flora. Swainson speculated about metals but Mueller spoke mainly of new drugs. He told La Trobe that it was an 'inestimable truth' that the medical properties of plants could be safely deduced from their natural alliances. Thus he suggested that Victoria's *Polygala veronicea*, like Austria's *Polygala amara*, could be used to treat consumption, and that *Tasmanica aromatica*, like a similar tree in Tierra del Fuego, could be used in cases of rheumatism and intermittent fever (Mueller 1853). The principle of plant affinity which Mueller derived from his belief in the natural system is still used in the search for new drugs. Nevertheless, the particular suggestions which Mueller made in 1853 and 1854 still await evaluation.

In his second report Mueller listed 13 indigenous species which he recommended variously for use in shipbuilding, furniture and ornamental work. The provision of information on Victoria's timber trees had originally been Swainson's main brief but in his reports he had little to say on the subject. He did suggest the red gum and stringy bark might have some uses in sawing or splitting, and that the native box could be used for fencing, but excused himself from further comments. '[T]he Colonial Botanist has had the requisite facilities placed at his disposal', La Trobe was told, 'he will doubtless have succeeded far better than myself in developing the *economical* properties of the Victoria timber trees' (Swainson to La Trobe, 2 Oct. 1853). Mueller particularly drew attention to *Eucalyptus globulus* in his second report which, although common in southern forest districts, was apparently not known to Swainson. 'Experiments in Van Diemen's Land', Mueller told La Trobe, 'have shown . . . [this wood] is equal in durability to oak and superior to it in size' (Mueller 1854).

'A SERIES OF TRASH AND NONSENSE': THE CRITICS AT WORK

It is fair to say that both Mueller and Swainson's reports lived up to La Trobe's expectations. He had written to Gunn in June 1853 in a tone of resignation, 'I am prepared to see [Swainson's] statement of his labours in Victoria most plentifully interlarded with complaints of hardships & want of cordial cooperation. But *n'importe*' (La Trobe to Gunn, 30 June 1853). Such was not the case with Mueller. Again, La Trobe expressed his opinion to Gunn. 'I send you the first copy at my disposal of Dr Muellers report upon our Vegetation. It is one you will read with interest — & admit does him great credit — I consider myself very fortunate to have secured to the Colony a man of class and talent & perseverance' (La Trobe to Gunn, 27 Oct. 1853). In transmitting these (and Selwyn's) reports to the Colonial Office in London, La Trobe stated of Mueller's that 'there can be no doubt of its value and of the interest which it will excite', and further that Mueller's abilities both in the collection and examination of the flora were 'beyond all question'. Of Swainson's report he was carefully noncommittal, declaring he would leave the assessment of its scientific or economic importance to 'more competent judges' (La Trobe to Colonial Secretary, 24 Nov. 1853).

Swainson believed that his discoveries would 'be regarded with as much surprise and incredulity, among the Botanists of Europe as that of gold in Australia among the Geologists of Britain' (Swainson to La Trobe, 2 Oct. 1853). He was right. William Hooker described Swainson's report as 'brief' and 'startling', and thundered in disbelief that all the work had been done without reference to a single book (Hooker 1854). 'In all my life I think I never read such a series of trash and nonsense. There is a man who left this country with the character of a first rate naturalist (tho' with many eccentricities) and of a very first rate natural history

artist, and he goes to Australia and takes up the subject of botany of which he is as ignorant as a goose' (William Hooker to Mueller, 9 Apr. 1854).

Local opinion in Melbourne was a little more polite. William Adamson in writing to William Hooker remarked that the report was 'meagre' and he personally could find only three species of gum and two casuarinas around Melbourne (Adamson to William Hooker, 21 Jan. 1854). From New Zealand came more adverse comment. William Colenso, amateur botanist from the north island, told his friend Joseph Hooker 'I should not be too ready to believe his statements of his having discovered "many hund. sp." etc, etc, for from what I have heard of him, I believe he is superlatively fond of sounding for his own fame: & that he knows next to nothing of N. Z. Boty' (Natusch & Swainson 1987). Still later came Joseph Maiden's celebrated denunciation of Swainson's 'reckless species-making . . . unparalleled in the annals of botanical literature' (Maiden 1902).

By the time Swainson submitted his reports to La Trobe in 1853 quinary theory (and many other classification schemes) had fallen into disrepute in England, and in botany the de Candolle system had been accepted. Mueller's work was thus uncontroversial in its classifications. It is not clear whether Swainson used quinary theory in his reports, but he had attracted such opprobrium in England as the theory's chief propagandist that anything he wrote was likely to be given a sceptical reception rather than a considered appraisal. Swainson had certainly offended other scientists by his high-handed dismissal of their research. Most subsequent criticism of Swainson's reports has been of his multiplication of species. None of the other ideas he floated has received any comment. The fact that as a zoologist he was presuming to write a technical botanical paper also attracted little comment. Swainson's Australian writings were assessed as containing nothing of taxonomic significance and have never been referred to in subsequent papers on eucalypts or casuarinas (Galloway 1978). Mueller's reports, however, were quickly accepted and remain part of the canon of botanical literature.

'MUCH GOOD MAY HE DO YOU': THE END OF SWAINSON'S CAREER

Swainson left Victoria for Tasmania in October 1853, pleased to see the end of what he termed 'that hateful place' (Swainson to Gunn, 25 Feb. 1854). His departure was equally welcome in other quarters. Some months earlier, when Swainson's term of appointment was little more than half expired, La Trobe was moved to comment, 'I have signified my willingness not to stand in his way & to set him at liberty to take advantage of the more lucrative situation offered him in V.D. Land . . . I have long ago [despaired] of any satisfactory result of his visit to this Colony' (La Trobe, 30 June 1853). As Swainson's complaints continued La Trobe became more exasperated. When Swainson finally left, La Trobe wrote to Gunn, 'You have now old Mr Swainson with you — much good may he do you' (La Trobe to Gunn, 27 Oct. 1853). Even as far away as London, William Hooker noted that it was 'a matter of congratulation . . . that the terms of Mr Swainson's engagement with the colony has expired' (William Hooker to Colonial Secretary, 6 March 1854).

Barely two months after he arrived in Victoria Swainson was looking forward to the end of his engagement (Clarke to Swainson, 18 March 1853). The result was his employment by the Tasmanian government to collect specimens and seeds for four months at the rate of £50 per month, but without the provision of lodgings or rations. When this expired he occupied himself with the arrangement of the shell collections belonging to the Hobart museum. Typically he found it in a mess (Swainson to Gunn, 14 Nov. 1853). Conchology at this time occupied much of his attention. He made an extended field trip to Port Arthur to collect shells and spent much time in the company of Joseph Milligan (Swainson to Gunn, 14 Nov. 1853, 22 March 1854). He was inspired by his experiences to propose writing a con-

chology of Tasmania. However, this renewed interest in shells did not take all his time. While at Port Arthur he continued to find new species of eucalypts, '5 or 6 distinct species of my new Genus *Denisonia* or Blue Gums' (Swainson to Gunn, 13 Feb. 1854). (This was probably *Eucalyptus globulus* which he had apparently overlooked in Victoria.) He also started a study of *Leptospermum* having 'found they were just as imperfectly described as the Casuarinae (and from the same cause)' (Swainson to Gunn, 13 Feb. 1854). This gave him another opportunity to dismiss the work of previous (and contemporary) botanists, including Joseph Hooker (Swainson to Gunn, 25 Feb. 1854).

Despite his intention to publish further on his Victorian researches, and his continued botanical activities in Tasmania, no further botanical papers came from Swainson's pen. His last scientific contributions, published by the Royal Society of Tasmania, comprised only four papers; three on shells and the fourth on the preparation of dried skins. He attended several meetings of the Society (of which he was a member) where he could not resist the opportunity to take a swipe at Mueller. The proceedings reported him as saying 'there exists a wide and marked difference between the trees of Tasmania and those of Victoria, notwithstanding the positive assertions to the contrary published in the recent report of the Victorian Colonial Botanist' (Anon. 1855). Swainson continued to conduct a war of words with Melbourne about the settlement of his accounts and the payment of wages to his assistant (Fowler to Foster, 2 June 1854, 20 Sept. 1854). He found Tasmania an uncongenial place, complaining of the cold weather (even though it was summer) and finding the country and its productions greatly disappointing. He determined to return to New Zealand as soon as possible; 'no consideration whatever will induce me to remain a single day in these colonies longer than is necessary' (Natusch & Swainson 1987).

Swainson returned to New Zealand in June 1854, much to the relief of his family. During all the time he had been in Australia they struggled to keep the farm afloat. However, Swainson was now 65 years old and in poor health, and did not live to enjoy a fruitful old age. He died in December 1855. His son considered his father's decision to emigrate to have been his 'greatest mistake' and the family's life in the antipodes 'a succession of disappointments and misfortunes from beginning to end' (Parkinson 1985).

Nothing remains at the National Herbarium of Victoria of the drawings and collections Swainson made for the Victorian government. These were the things for which he was most likely to be respected by later botanists. He complained that his drawing paper and specimens were being ruined because of the unsatisfactory state of his Dandenong lodgings (Swainson to Lonsdale, 7 March 1853). Having indicated his wish to terminate his engagement in Victoria, Swainson was informed that, to facilitate his departure, his collections should be handed to the Superintendent of the Botanic Gardens, John Dallachy, as soon as convenient (Lonsdale to Ginn, 17 May 1853). Mueller believed the drawings to be of little practical use because of incompleteness. The few specimens Mueller saw were greatly ruined from having been packed before being dried properly (Mueller to William Hooker, 14 July 1854).

Swainson's unhappy visit to Australia marked the low point and the end of his career. By contrast, Mueller still had most of his to run. He was yet to publish a flora of Victoria, yet to try for the flora of Australia, yet to make his mark in systematic botany. Thus far he had won acclamation from his peers, and the expectation that he would continue to do so.

'OBSERVATIONS ONLY FRAGMENTARY': THE REST OF MUELLER'S CAREER

In 1854 William Hooker wrote of Mueller to Victoria's Colonial Secretary, 'he has the materials before him of an excellent and useful "Flora of the Colony of Victoria"'. Hooker requested that the governor and his executive council sanction its publication. In an annotation on Hooker's letter the Governor, Charles

Hotham, wrote, 'at present it is impossible to accede — but if the next financial year finds the Colony in a better state Sir W. Hooker's desire will be entertained' (Hooker to Foster, 2 Nov. 1854). The gold that had initially increased government revenue had by now made a chaos of Victoria's economy. Moreover, the scientifically-minded La Trobe was gone. It was to be five years before Mueller published *The plants indigenous to the colony of Victoria*. In his dedication to volume one he thanked La Trobe 'to whom, as former Lieutenant-Governor of Victoria, this work owes its origin'; William Hooker, 'the Nestor of Botanists'; and Governor Henry Barkly, 'under whose encouragement these volumes are advancing to completion' (Mueller 1860–2).

At the same time as Mueller finished Victoria's flora the question of who would write that of Australia was being discussed at Kew. Joseph Hooker wanted George Bentham to do the work. In a letter to Mueller (Fig. 4) of May 1861 he emphasized the knowledge, skill and experience required for such a massive undertaking; 'all this I assure you requires work of a very different character from what you have been accustomed to and a head for systematic methodology that you have never felt called upon to exercise' (Joseph Hooker to Mueller, 24 May 1861). Mueller may have impressed La Trobe and Barkly in Australia, and even William Hooker, but his authority and reputation were definitely not sufficient to persuade Joseph Hooker and Bentham to grant his much cherished wish to write the flora. Bentham took great pains to rationalize the slight to Mueller, saying in the preface to the first volume of *Flora australiensis* that Mueller's inability to visit European herbaria was the only stumbling block (Bentham 1863).



Fig. 4. Ferdinand Mueller 1861 (Reproduced from *Curtis's botanical magazine dedications 1827–1927*, London, 1931.)

Mueller never published an Australian flora or even a supplement to that of Bentham. He did, however, bring out two systematic censuses in which he 'availed himself of the opportunity, to place on record independently his views on preferable systematic sequences of orders' (Mueller 1882). Mueller's own researches had also led him to redraw the limits of some genera and many species. 'But the system, built up by [de Candolle and Jussieu]', he was careful to add, 'is in its main features so genuinely natural, that no subsequent research could bring about very material changes'. Mueller dedicated his first systematic census of Australian plants to George Bentham, Joseph Hooker and Alphonse de Candolle, 'all three sons of great men'. In so doing he emphasized that his own work was more allied to the previous generation of theorists. He may also not have minded if readers were prompted to observe that his reputation owed nothing to a famous father.

Finally, while Swainson may have had the first word in his argument with Mueller about eucalypts (Fig. 5), Mueller definitely had the last. In 1879 he published the first part of *Eucalyptographia*. It was a work which he had in contemplation since his arrival in Australia. 'Mr Swainson has been engaged in [eucalypt] examination for years', Mueller told William Hooker in 1853, 'but our views with regard to the limits of the species diverge so wi[dely] that we could not cooperate, as I otherwise would have sincerely desired' (Mueller to Hooker, 18 Oct. 1853). Like Swainson's 1853 report, *Eucalyptographia* contended 'that of all generic groups of Australian plants that of Eucalypts is the most difficult for elaboration'.



Fig. 5. *Eucalyptus robusta* (?). Drawing by William Swainson. (Reproduced by permission of the Alexander Turnbull Library, Wellington, New Zealand.)

Mueller also noted that several species differed only in regard to the persistence or secession of their bark according to 'geologic influences'. Unlike Swainson, however, Mueller did not claim to have all the answers. '[T]he subject is so large and surrounded by so many perplexities,' he declared in *Eucalyptographia*, 'that even now [the author] can offer his observations only fragmentary'. The total number of eucalypts in *Eucalyptographia* was 100. In Mueller's *Second systematic census of Australian plants* (1889) it was 134. Both totals were less than the more than 200 in *Index kewensis* (Jackson 1885), and considerably less than the 700-odd species recognized today. And all of these totals fell well short of Swainson's 1520 species.

CONCLUSION

Swainson arrived in Australia as a zoologist of considerable knowledge and experience but one who always seemed to be at odds with the establishment. Mueller on the other hand was a young and enthusiastic botanist, but also unknown and untried. Lieutenant-Governor La Trobe was responsible for each of their appointments to the Victorian public service. He was interested in science, had considerable influence over the colony's substantial revenues and few opportunities to catch 'such ingenious birds'. That seems to be why he unquestioningly allowed Swainson to take up a botanical project, and also why he made another botanical appointment within such a short time. Nevertheless, the continued dismissal of Swainson's work and the acclamation given to Mueller's have almost made it seem that La Trobe did appoint only one botanist. There can be no doubt that Swainson's main offences were his extreme species-making and dismissal of other scientists' work. Other and subsequently more tenable speculations in his *Botanical report* (1853) have gone unnoticed. Mueller in his reports was careful to locate his work within an established framework, and not to claim too much credit for himself. His conclusions were uncontroversial. Later in his career he had struggles for authority, and also lived to see younger men pursue ideas he could not accept. However, he has remained within a tradition that is still theoretically acceptable.

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- Kew Archives, Royal Botanic Gardens, Kew, England. Director's letters vol. 74, Australian letters 1851-1858.
- ML Mitchell Library, State Library of New South Wales, Sydney, Australia.
- NHV Archives, Royal Botanic Gardens and National Herbarium of Victoria, South Yarra, Australia.
- VPRS Public Record Office, Laverton, Victoria, Australia. VPRS 1189, inwards registered correspondence, VA 856 Colonial Secretary's Office; VPRS 3219, outwards registered correspondence, VA 856 Colonial Secretary's Office; VPRS 3991, inwards registered correspondence, VA 856 Colonial Secretary's Office.

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